

DIVISION ENGINEER

UNION RIVER ELLSWORTH MAINE

SURVEY (REVIEW OF REPORTS)



**DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.**

MAY 1970

SYLLABUS

The Division Engineer has studied the request of local interests for general navigation improvements at Union River, Maine. He finds that provision of additional anchorage at the head of navigation and restoration of the existing 3-3/4 mile long Federal channel to its project dimensions would be required to safely and adequately provide for the existing and prospective commercial fishing and recreational boating fleets. However, the benefits to be expected from this plan of improvement are insufficient to justify the cost for construction. The first cost of construction is estimated at \$1,083,000. The annual benefits to be \$6,500 with annual charges amounting to \$72,500.

Therefore, the Division Engineer recommends no modification of the authorized Federal navigation project for Union River, Ellsworth, Maine at this time.

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REPORT MAPS

Plates 1 through 3

APPENDICES

- Appendix A U. S. Fish & Wildlife Service Report
- Appendix B City & State Comments

SUPPLEMENT - Additional Information Called for by Senate Resolution
148, 85th Congress, 1st Session



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

IN REPLY REFER TO:

NEDED-R

20 May 1970

SUBJECT: Survey (Review of Reports) of Union River, Maine

TO: Chief of Engineers
ATTN: ENGCW-PD

AUTHORITY

1. This report is submitted in compliance with a resolution adopted 27 March 1962 by the Committee on Public Works of the United States Senate, which is quoted as follows:

"RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Board of Engineers for Rivers and Harbors created under Section 3 of the River and Harbor Act approved June 13, 1902, be, and is hereby requested to review the report of the Chief of Engineers on Union River, Maine, published as House Document Numbered 124, Fifty-fifth Congress, second session, and other reports, with a view to determining whether the existing project should be modified in any manner at the present time."

PURPOSE AND EXTENT OF STUDY

2. This study has been made to determine the economic justification and engineering feasibility for modifying the existing Federal navigation project at Union River in accordance with the needs and desires of local interests. In order to develop a plan, it was necessary to determine the status and use of existing navigation conditions. To accomplish this, a hydrographic survey was made. Statistics on commercial and recreational boating activities, maps, charts, aerial photographs and other related data have been studied to determine potential benefits. A public hearing was held on 29 March 1967 at Ellsworth, Maine to obtain the views and desires of local interests for navigation improvements. The improvements desired as well as alternatives have been studied.

DESCRIPTION

3. Union River, originating in the south central part of Maine, is a small stream adjoining the southeastern portion of the Penobscot River Basin. It is formed by two branches whose confluence is about 15 miles above tidewater at Ellsworth. The east branch is 24 miles long and the west branch 35 miles long. The total river length, including these branches, is 75 miles. The river flows through the city of Ellsworth which is located 29 miles southeast of Bangor, Maine and 15 miles northwest of Bar Harbor, Maine.

4. Navigation of the waterway is made from Blue Hill Bay through the deep waters of Union River Bay to the mouth of Union River. This portion of the waterway is about 9 miles long and has depths ranging from 20 to 230 feet. From its mouth Union River follows a winding course for 3-3/4 miles to the head of navigation near the business section of Ellsworth. A rapids exists just upstream of the head of navigation where a former dam was destroyed. Controlling depths (1968) in the river are 3.3 feet at its 1/2 mile point and 0.0 feet in the vicinity of the city wharf. All depths in this report refer to the plane of mean low water established by the Coast and Geodetic Survey for this locality. The maximum river width from shore to shore at mean high water is 3,200 feet at its mouth, narrowing to 200 feet at some of the bends.

5. The river has a drainage area of 500 square miles and a mean annual discharge at its mouth of 1,000 cubic feet per second. The slope of the main stream is slight, averaging 0.2 foot per mile.

6. The mean range of tide is 10.4 feet at the river's mouth. The spring range is 11.5 feet. The locality is shown on U.S. Coast and Geodetic Survey Chart No. 307, on U.S. Army Map Service Quadrangle Sheets titled "Mount Desert and Ellsworth, Maine", and on PLATE NO. 1 of this report.

TRIBUTARY AREA

7. The river's tributaries consist of small brooks. The Union River basin area is nearly all wooded and contains little cultivated lands. There are a large number of ponds and small lakes within the drainage area. The principal community on the river is Ellsworth in Hancock County. The navigable river area is tidal and lies entirely within the city of Ellsworth, which had a population of 4,444 in 1960. This is an increase of about 500 people since the last census was taken in 1950, or approximately one percent per year. The city of Ellsworth is the largest industrial, commercial, banking, shopping center and service trade center in Hancock County. The principal industrial activities are centered around lumber and concrete block manufacturing, and marble works. The locality is served by the Maine Central Railroad and a network of primary and secondary roads which provided easy access to Interstate Route 95 at Bangor.

BRIDGES

8. There are no bridges crossing the portion of the river under study.

PRIOR REPORTS

9. This waterway was studied and reported upon by the Corps several times between the years 1867 and 1932. Data pertinent to these reports are listed below:

<u>Date</u>	<u>Type</u>	<u>Recommendation</u>	<u>Published</u>
10 Sep 1867	Survey	Favorable	(1)
30 Nov 1888	Prelim. Exam.	Favorable	(1)
11 Jan 1890	Survey	Favorable	H. Ex. D. 138-51-1
30 Jan 1897	Prelim. Exam.	Favorable	(1)
22 Oct 1897	Survey	(2)	H.D. 124-55-2
12 May 1926	Prelim. Exam.		H.D. 467-69-1
18 May 1929	Prelim. Exam.		H.D. 648-71-3
9 Oct 1930	Prelim. Exam.		(1)
10 Aug 1932	Survey		(1)

(1) Not Printed

(2) Unknown

EXISTING CORPS OF ENGINEERS PROJECT

10. The existing project was adopted in 1896 and provides for a channel 6 feet deep at mean low water and 100 to 200 feet wide over a reach of about 3-3/4 miles. The portion of the river that has been improved is tidal and stretches from Union River Bay to the foot of the rapids, the head of navigation at Ellsworth. The project was completed in 1902 at a cost of \$147,000 and maintenance dredging was last performed in 1909 at a cost of \$16,000. Maintenance of the project was discontinued in 1911. In 1926, abandonment of the Federal project was recommended but no action was taken by Congress on this recommendation.

LOCAL COOPERATION ON EXISTING AND PRIOR PROJECTS

11. Specific items of local cooperation were not required for the existing project.

OTHER IMPROVEMENTS

12. Except for a number of privately-owned wharves located along the shore of Union River, no known improvements for the benefit of general navigation have been made by local interests in Union River.

TERMINAL AND TRANSFER FACILITIES

13. At the present time there are no public or commercial boat terminal facilities along the river. The remains of a few commercial wharves, evidence of a past era when Ellsworth was the lumber capital of eastern Maine, dot the shoreline at the head of navigation near the city's business section. In this same area, the city of Ellsworth reportedly owns 710 feet of shore frontage which includes a timber pier. Between 600-800 feet downstream of the rapids there is a boat ramp with a boat storage yard adjacent thereto, having a capacity of 12 boats. The adjacent mooring area is dry at mean low water. A boatyard and wharf are located on the river's left bank in "Nat's Cove", about

3/4 mile upstream from the mouth. The cove is dry at low tide and the yard operates on a part-time basis. The yard provides docking and mooring space for several boats during favorable tidal periods and storage for about 15 boats. The remaining few piers are small timber wharves located in rather isolated areas along the river's tidal reach.

14. At present, the Maine Shellfish Company is the city's only fish dealer. All its products are trucked to the plant which is located on the river's east bank at the head of navigation. If the river were improved as desired, the company states it would construct a terminal for use by the prospective commercial fishing fleets.

IMPROVEMENTS DESIRED

15. In order to determine the nature and extent of navigation improvements desired by local interests, a public hearing was held on 29 March 1967 at City Hall in Ellsworth, Maine. Attendance included state and city officials, yacht club interests, boatyard owners, commercial and industrial interests and local residents. This audience numbered about 100.

16. A detailed plan of improvement was submitted by the Union River Improvement Committee. The committee spokesman described existing conditions and recommended study of the following navigation improvements which are considered essential for the full use of the river, particularly at the head of navigation for both commercial and recreational boating:

a. Extension of the upstream end of the Federal channel to the foot of the rapids, a distance of about 1,200 feet;

b. Provision of an anchorage on the east side in the "Basin" at the head of navigation; and

c. Restoration of the existing Federal project.

Also, a local boatyard owner requested provision of anchorage space for small boats at the river's 3/4-mile point, in Nat's Cove".

17. All present at the hearing favored improvement. As justification for improvements, local interests cited difficulties experienced in attempting to navigate the waterway as a result of inadequate widths and depths, particularly at low tidal stages. At such times, navigation on the river is near impossible and at higher stages very risky for all craft. Boats often run aground.

18. They further claimed that anchorage in the river is limited. Boats anchor either in the channel or in the tributary brooks and coves. In the coves and brooks boats go aground at low water. In the river the existing fleet is forced to anchor chiefly at the head of navigation. Provision of an anchorage in the "Basin" would, they feel, result in relocation of the existing recreational fleet to that area. They report that a large number of recreational boats make use of the nearby Union River Bay area and feel improvements would result in many of these boats visiting the upstream area at Ellsworth. Also, boat storage and repair yards, now practically abandoned, would once again prosper.

19. The committee spokesman stated that provision of the requested improvements would result in the relocation of 25 of the 30 licensed lobster boats to Union River. Terminal facilities would be provided for such use. These vessels are now located in the nearby harbors of Surrey, Trenton and Lamoine. Union River Bay provides the fishing grounds for most of these boats. The committee spokesman stated the belief that if the upstream channel extension is provided, 15 scallop draggers now operating in Union River Bay would make use of the river and unload their catch at a pier to be provided. Local interests also requested that should additional navigation improvements be found uneconomical, restoration of the existing Federal project be accomplished.

EXISTING AND PROSPECTIVE COMMERCE

20. The latest available commercial statistics show that waterborne commerce amounted to 11,000 tons in 1911. A recent inspection of the locality showed that the river is now used by about 15 recreational craft and that commercial navigation is virtually non-existent. The gradual loss of adequate navigation facilities is claimed to be the reason of the decline of commercial vessel traffic.

21. Lobstering is a major commercial interest in the area. At present, all fish and shellfish products are trucked to Ellsworth. With improvement, local interests believe the waterway would be used to transport marketable products. City officials report that dumping of industrial wastes and sewage into the river has polluted the waterway and that some 643 acres of shellfish beds are contaminated. Water quality standards for Union River, established by the State of Maine and scheduled to be in practice by 1975, are expected to significantly reduce contamination of the waterway. Clams are presently found and commercially harvested in the general area outside the river.

VESSEL TRAFFIC

22. There are no detailed statistics available pertaining to vessel trips on the waterway. Vessel traffic in the waterway is confined solely to recreational boating. The fleet of 15 recreational boats consists of inboards and outboards with no vessel longer than 30 feet or drawing more than 3 feet. Vessel trips are confined to favorable tidal periods because of existing shoal conditions. On this basis, it is reasonable to assume that no more than 400 vessel trips are made each year. All vessel traffic is confined to the tidal reach of the river.

DIFFICULTIES ATTENDING NAVIGATION

23. The chief navigation difficulty results from inadequate channel depths and insufficient anchorage. Terminal facilities are practically non-existent. Local interests claim vessel groundings have occurred in the river, but no records have been kept.

WATER POWER AND OTHER SUBJECTS

24. The waterway is tidal. Flood control, water power and other related subjects are not pertinent to this report.

PLAN FORMULATION

25. The requirements of the existing and prospective fleets were investigated. Inspection of the river area revealed the existence

of a small permanently based recreational fleet of 15 boats. Commercial vessel usage has not existed for several decades. With improvement, the recreational fleet is expected to experience some new growth because of the natural shelter and attractions at Union River and its proximity to the popular summer boating area of Union River Bay. As a basis for projected future boating growth, "OBERS Projections", from OCE have been used. These projections for coastal areas of Maine indicate a moderate increase in personal income over the next 60 years. At the same time, per capita income projections show a rate of 2-3/4 percent compounded annually or a total rate of 506 percent over the same period. In view of the large summer residency at Ellsworth, per capita income is considered a real measure in wealth available to satisfy boating desires. Also, boating growth has been inhibited by the lack of boating facilities in the river. Therefore, a conservative growth rate of four percent per year over project life, much lower than the estimated per capita income rate, has been used to best represent future boating trends at Union River. As a result, the prospective number of additional boats that will be added to the existing recreational fleet is 30. A prospective transient fleet, equivalent to 6 permanently based craft, is also expected after improvement. The prospective commercial fishing fleet would consist of eight lobster boats and one dragger. On the basis of these combined space requirements, it is estimated that in the next 50 years there will be a demand for a total of 60 mooring spaces in Union River.

26. Examination of the type, draft and length of boats now using and expected to use the waterway together with a review of tide fluctuations in the area, indicate that an average of seven 30-foot long boats per acre can safely moor in a 6-foot deep anchorage if moored at the bow and allowed to swing free in overlapping circles. Considering the 60 spaces required, 10 acres of anchorage will be needed.

27. The head of navigation is located in the city's business section and offers the most practical place for expansion of boating interests. The existing Federal project offers a total of about 4.5 acres. Allowing a fairway for boats to enter and leave, including room for maneuvering, effective anchorage space is reduced to 3.5 acres. Of the 60 mooring spaces required, 24 could be accommodated in the existing project anchorage, if restored. The remaining 36 spaces could be accommodated by new anchorage.

28. Based on the results of the hydrographic and probing survey made in 1968, the Federal channel has shoaled to a considerable degree over a large portion of its length. This shoaling has occurred in the lower and upper reaches including the entire head of navigation. Investigation into the character of the materials showed substantial quantities of very hard material and ledge rock. Intermingled with these materials, significant quantities of mill waste, slabs, and sawdust are present in the upper reaches of the river and more could be encountered in the river channel.

29. Consideration was given to the plan advocated by local interests which calls for a 1,000-1,200-foot upstream channel extension and anchorage in "The Basin", both to a depth of 6 feet and restoration of the existing Federal project which is necessary to any upstream improvements. The high cost involved in the drilling, blasting and removal of rock and the high cost to dredge and dispose of these materials well out to sea, resulted in a need to consider a plan of less magnitude. Further, the inner rapids pose a potential danger to boats mooring in the upstream area. An alternative plan was considered which would provide an enlarged upstream anchorage. This change in design would significantly reduce rock removal costs and avoid the hazard from the rapids.

30. Allowing for adequate clearance around the area for pier construction and necessary attendant berthing space, the remaining area upstream of the head of navigation likely to be improved for navigation amounts to about 2 acres and the area in the basin amounts to 4 acres. These two new areas together

with the existing project's 4-acre anchorage would yield a total of about 10 acres. These areas are equivalent to the total area requested for improvement at the public hearing. Investigation found spoil material would, in all likelihood, contain some sewage sludge. City officials report that they know of no area along the river suitable and/or desirable for the disposal of these materials on marshes in the area. Therefore, with no other practical land areas available for disposal of dredged materials, an approved offshore dumping ground would be used.

31. Consideration was given to the need for protective training works at the channel's mouth. Examination of past and recent hydrographic survey data indicates the existing entrance channel dimensions have remained relatively stable over the past 40 years. Also, present entrance channel dimensions are adequate to satisfy the present and expected needs of navigation. Therefore, protective training works are not required.

PLAN OF IMPROVEMENT

32. In summary, the plan selected which benefits the entire waterway consists of:

- a. Restoration of the 6-foot deep, 100-200 foot wide, 3-3/4 mile long existing Federal project;
- b. A 2.0-acre anchorage, 6 feet deep, adjacent to the upstream end of the existing project;
- c. A 4.0-acre anchorage, 6 feet deep, in the basin adjacent to the 6-foot channel at the head of navigation.

This plan will be adequate to serve the needs of existing and prospective boating on the waterway. It is anticipated that anchorage areas will be increased in size by future marina type mooring facilities to be constructed by local interests as needed.

SHORELINE CHANGES

33. The selected plan of improvement is along the existing channel with expansion of the channel area at the head of navigation to provide space for anchorage. Dredging, as proposed, will not significantly change or adversely affect the adjacent shoreline.

REQUIRED AIDS TO NAVIGATION

34. The need for additional navigation aids in the river was investigated. It is considered that a total of four additional buoys will be required. The buoys are estimated to cost about \$1,000 initially, with annual maintenance costs of about \$100.

ESTIMATE OF FIRST COSTS

35. Dredging quantities are based on hydrographic surveys made in 1968, and include a one-foot allowance for overdepth and side slopes of 1 vertical on 3 horizontal. Cost estimates were based on October 1969 price levels for work involving the removal of very hard materials from the new anchorage areas, ordinary materials from the existing Federal channel and disposal at sea approximately 18 to 25 miles from the project site. Two landings are required, one commercial and one recreational, both the responsibility of local interests. A commercial 350-400 foot timber pile and deck wharf extending from the Maine Shellfish Company's property to a small berthing area adjacent to the upstream end of the considered anchorage, would likely be the most practical and least costly method for providing fishermen a place to land their catch. A suitable landing in the basin for recreational boats has been estimated at \$12,000.

PROJECT COST ESTIMATES

<u>Cost Acct. No.</u>	<u>Feature</u>	<u>Cost Estimates</u> (May 1970)
	<u>FEDERAL</u>	
09	Anchorage (6 feet deep)	
	2-acre enlargement of existing anchorage at head of navigation by removal of 24,450 c.y. hard materials including mud, sand and gravel @ \$9.00/c.y.	\$ 220,000
	4-acre in the basin at the head of navigation by removal of 60,000 c.y. hard materials including mud, sand and gravel @ \$9.00/c.y.	540,000
		<u>\$ 760,000</u>
	Contingencies	110,000
30	Engineering & Design	52,000
31	Supervision & Administration	<u>68,000</u>
		\$ 990,000
	Aids to Navigation (Corps of Engineers) (est.)	<u>1,000</u>
		\$ 991,000
	<u>NON-FEDERAL</u>	
	Commercial Landing (timber) 400 ft. x 10 ft. L-shaped approach incl. 80 ft. x 10 ft. T-head	80,000
	Public Landing	<u>12,000</u>
		\$1,083,000 ⁽¹⁾

(1) Excludes Federal maintenance dredging to restore existing project dimensions involving about 116,000 c.y. of ordinary materials including some mill waste estimated to cost \$600,000.

ESTIMATE OF ANNUAL CHARGES

36. The estimated annual charges for the selected plan of improvement are based on a project life of 50 years at an interest rate of 4.875 percent for both Federal and non-Federal interests. Additional annual maintenance charges are based on experience with similar projects. No maintenance work has been done on the existing Federal project since 1911. Existing depths in the upper and lower reaches of the channel are presently less than the authorized 6-foot depth and considerably deeper throughout its mid-section. A large amount of material was deposited in the channel due to a dam failure in 1923, which released trapped sawdust from 19 upstream sawmills. The dam was rebuilt and the sawmills now no longer exist. To restore the channel to project dimensions would require the removal of 116,000 cubic yards of material. Since the authorized channel dimensions are adequate for the type of craft using or expected to use the river, no additional channel maintenance would be required.

37. Additional annual maintenance would, however, be required for the proposed anchorage. The average annual rate of shoaling is estimated to be 1,000 cubic yards per year resulting in additional average annual maintenance cost of about \$5,000. The charges are as follows:

FEDERAL

Interest and Amortization ($0.05372 \times \$540,500$)	\$ 29,000
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Maintenance

Restoration of 6-foot channel - \$600,000/60 years (1911-1971)	10,000
Anchorage	5,000
Aids to Navigation	<u>100</u>

Total Federal Charges \$ 44,100

NON-FEDERAL

Interest and Amortization ($0.05372 \times 449,500$)	\$ 24,100
Commercial Landing (int. & amort. ($0.05372 \times 80,000$) (Includes access channel and berths)	<u>4,300</u>
Total Non-Federal Charges	\$ 28,400
Total Annual Charges	\$ 72,500

ESTIMATE OF ANNUAL BENEFITS

38. Benefits from improvement of the waterway would accrue to the existing and prospective recreational fleets. The existing recreational fleet will benefit from increased use of the existing fleet and from resulting expansion. Expansion will consist of boats added immediately after improvement and those added gradually after improvement. Benefits would also accrue to limited degrees to the prospective fishing fleet.

39. An investigation was made of the present commercial navigation activities on the river at Ellsworth. The shipment of goods via the river ended sometime in the 1920's. No commercial navigation, nor any commercial fish wharves exist on the river at the present time. There is, however, one fish dealer located in Ellsworth at the head of navigation. Land elevations along the river at the company's property are well above the highest tide. The lobster fishing grounds are in nearby Union River Bay. The U.S. Fish & Wildlife Service, in cooperation with the Maine Department of Sea and Shore Fisheries, report (APPENDIX A) that improvement of the river would make it possible to market fish products in the Ellsworth area without difficulty. As a result, some benefits to the commercial fisheries would occur. Local fishing interests claim Ellsworth presently has 30 licensed fishermen. They report a 25-boat commercial lobster fleet would locate permanently at Union River soon after improvement. In addition, these boatowners are taking about 25 tons of lobster from Union River Bay annually.

Present practice by local fishermen is to land their fish catch at a number of convenient places in the Union River Bay area, sell the catch to a local trucking merchant who in turn transports and sells the catch to the wholesale company in Ellsworth.

40. At a meeting with city officials and local fishing interests, it was found that a Union River fishing fleet would, in all probability, be much smaller in number than originally envisioned. Evidence obtained strongly indicates local fishing boatowners do not plan to base their boats at Union River, even if improved. However, several fishing boatowners would use the river to bring in their catch. On this basis, a new transient fishing fleet would develop soon after improvement. This transient fleet would consist of 8 lobster boats and one dragger. No other evidence of expansion of the fishing industry as a result of improvement could be determined at this time.

41. The local fishing season is about 90 days with boats fishing these waters about 3 times a week and catching an average of 60-70 pounds of lobsters per boat per day. On this basis, each of the expected eight lobster boats would land an average annual catch of 2,500 pounds at Ellsworth. The prevailing wholesale price for lobster in the area is \$0.80 per pound. The gross value of the annual catch per boat would then be $\$0.80 \times 2,500$, or \$2,000 per season. Normally about 60 percent of the gross value is attributable to costs incurred in catching the fish. In this case, however, the catch is landed elsewhere and trucked to the plant at Ellsworth. Therefore, it is not the net value of the total catch that is a direct benefit to the planned improvement but rather the elimination of the added expenses incurred by the fishermen to truck the catch. The cost for trucking and re-handling the catch is estimated at $\$0.03$ per pound \times 20,000 pounds (total catch), or \$600 annually.

42. The only dragger expected to use Union River is presently berthed at Milbridge. This community has an existing active Federal navigation project with adequate fish terminal facilities. Furthermore, dragger operations would not appreciably improve nor would landing the vessel catch at Ellsworth rather than at Milbridge result in any significant benefit to the commercial fishing industry. Therefore, the decision of the vessel owner to relocate his vessel to Union River would be for convenience only. No tangible monetary benefits could be derived from the relocation.

43. Benefits to the recreational boat fleet have been evaluated as the gain in annual net return which the owner of the craft would enjoy if improvements were made. The return to the owners of recreational boats has been taken as the net amount the owners would receive if they desired to charter their boats to others. The value of this gain is expressed as a percentage of the current market value of the fleet. The gain represents the difference between present use of the harbor and the increased use that will be made possible as a result of improvement. Ideal return varies according to the size and type of boat. For this report, the ideal return would range from 14 percent for outboards, 9-12 percent for the larger and more expensive boats, and 14 percent for full-time charter boats.

44. There are no records of specific groundings or accidents involving vessel damages for which monetary benefits could be applied at Union River.

45. As noted previously, the waterway cannot be safely navigated at low tidal periods. Boats drawing 2 to 3 feet are limited to those periods when tides of 2 or more feet prevail. Boats moor in shallow anchorages, go aground and cannot be used until favorable tidal conditions permit. Consequently, full use of the harbor is denied to the locally-based recreational fleet. There are no records of the number of existing recreational boats using Union River as their home base. Field inspection and photos taken in 1968 together with information obtained at the public hearing, confirmed the existence of a small recreational boat fleet. The existing locally-based fleet is owned and operated by nearby residents and consists of about 15 small boats made up of 8 outboards and 7 inboards. Improvement of the river would make it possible for the existing fleet to navigate the river at all times, thus allowing full unrestricted use. The percentage of increased use for the various boat types in the existing fleet and their respective annual benefits have been computed and are shown on TABLE I. The total annual benefits are \$1,600.

46. Existing anchorage and channel areas have insufficient depth. Boats go aground at low water. These conditions, locals claim, prevent expansion of the existing recreational fleet. It is estimated

that the existing fleet will expand by 200 percent or 30 boats after improvement. This represents a growth rate of 4 percent per year over project life. Based on local predictions and comparison with similar river improvements in other localities, a total of 8 new boats would be added immediately after improvement with the remaining 22 boats added along a straight line growth over the project life. Annual benefits for these boats are shown in TABLES II and III and amount to \$1,600 and \$1,900, respectively.

47. At the present time, boatowners are enjoying an 80-90 day boating season in this area. It is estimated that improvement will result in about 250 boats visiting the river annually, each of which will stay on an average of two days by the end of the project life. On this basis, a prospective attracted transient recreational fleet equivalent to 6 locally-based boats is expected on a straight line basis after improvement. Annual benefits for these visiting craft are shown in TABLE IV and amount to \$800.

SUMMARY OF BENEFITS

<u>Source</u>	<u>No. of Boats</u>	<u>General</u>	<u>Local</u>	<u>Total</u>
<u>Fishing Industry</u>				
Reduced Cost of Transporting Lobster	8	600	0	600
<u>Recreational Fleet</u>				
Existing	15	800	800	1,600
New Boats (immediate)	8	800	800	1,600
New Boats (s.l. growth)	22	950	950	1,900
Prospective Attracted transient (ann. equiv)	6	400	400	800
Total Annual Benefits		3,550	2,950	6,500
Percentage		54.6	45.4	100

TABLE I - BENEFITS TO RECREATIONAL BOATING

EXISTING FLEET

HARBOR:

HARBOR:												
TYPE OF CRAFT	LENGTH (feet)	NO. OF BOATS	DEPRECIATED VALUE		PERCENT RETURN				VALUE	ON CRUISE		
			AVERAGE	TOTAL	Ideal	% of Ideal		Gain	\$	Avg.	% of	Value
			\$	\$		Pres.	Fut.		Days	Season	\$	
RECREATIONAL FLEET												
Outboards	15-20	8	1,200	9,600	14	50	95	6.3	600	-	-	-
Inboards	15-20	7	2,500	17,500	12	50	95	5.4	950	-	-	-
TOTALS		15		27,100					1,550 (Say \$1,600)			

TABLE II - NEW BOATS (IMMEDIATE)

Outboards	15-20	4	1,200	4,800	14	0	95	13.3	640	-	-	-
Inboards	15-20	1	2,500	2,500	12	0	95	11.4	290			
Sterndrive	15-20	2	1,900	3,800	12	0	95	11.4	430			
Cruisers	15-20	1	2,500	2,500	9	0	95	8.6	220			
TOTALS		8		\$13,600					\$1,580 (Say \$1,600)			

TABLE III - BENEFITS TO RECREATIONAL BOATING
NEW BOATS (GRADUAL GROWTH)

UNION RIVER, MAINE

TYPE OF CRAFT	LENGTH (feet)	NO. OF BOATS	DEPRECIATED VALUE		PERCENT RETURN				VALUE \$	ON CRUISE		
			AVERAGE \$	TOTAL \$	Ideal	% of Ideal Pres.	% of Ideal Fut.	Gain		Avg. Days	% of Season	Value \$
RECREATIONAL FLEET												
Outboards	15-20	5	1,200	6,000	14	0	95	13.3	800			
Inboards	15-20	3	2,500	7,500	12	0	95	11.4	860			
	21-30	2	4,800	9,600	11	0	95	10.5	1,000			
Sterndrive	15-20	4	1,900	7,600	12	0	95	11.4	870			
	21-25	2	3,600	7,200	11	0	95	10.5	760			
Cruisers	15-20	3	2,500	7,500	9	0	95	8.6	650			
	21-30	2	5,000	10,000	9	0	95	8.6	860			
	31-40	1										
TOTALS		22		55,400					5,800			
Av. Ann. Equiv. = 0.328 x \$5,800 = \$1,900												

TABLE IV - PROSPECTIVE TRANSIENT FLEET

Cruisers	21-30	5	5,000	25,000	9	0	95	8.6	2,150			
Aux. Sail	21-30	1	4,900	4,900	8	0	95	7.6	370			
TOTALS		6		\$29,900					\$2,520			
Av. Ann. Equiv. = 0.328 x \$2,520 = \$800												

COMPARISON OF BENEFITS AND COSTS

48. The comparison of the estimated annual benefits of \$6,500 to the estimated annual carrying charges of \$72,600 results in a benefit-cost ratio of 0.1 to 1.0.

COORDINATION WITH OTHER AGENCIES

49. All Federal, State and local agencies having an interests in the improvement of the waterway were notified of the public hearing held on 29 March 1967. Representatives of the city of Ellsworth and the State of Maine have been consulted concerning the effects of improvement on their activities. The U.S. Fish and Wildlife Service and the Maine Department of Sea and Shore Fisheries were also consulted. Their comments are contained in APPENDICES A and B of this report.

DISCUSSION

50. As a result of meetings with city officials and local fishing interests, it became known that local fishermen land their lobster catch at many different locations several miles from the business section of Ellsworth. A businessman buys the catch from these fishermen, trucks the same catch to the Maine Shellfish Company and sells it to them at a profit. The company would like to deal directly with the fishermen so as to increase its profit margin but apparently most of the local fishermen, because of the convenient arrangements they now have, are satisfied with whatever profit they now earn. Consequently, the majority of fishermen have not and will not come forward as requested and indicate their willingness to base their boats and/or use Union River, even if improved. The recreational boating benefits are not sufficient alone to offset the negligible commercial fishing benefits.

CONCLUSIONS

51. Present conditions at Union River restrict the use of recreational craft and continue to discourage commercial navigation interests from using the river and constructing needed wharf facilities. All of these problems and the risks involved in using the

river could be significantly reduced by the selected plan of improvement; however the benefit-cost ratio of 0.1 indicates that the improvement is not economically justified. Therefore, it is concluded that reconstruction of the existing Federal project and the construction of two additional anchorages at the river's head to provide Ellsworth with an unrestricted waterway for boats is not warranted at this time.

RECOMMENDATIONS

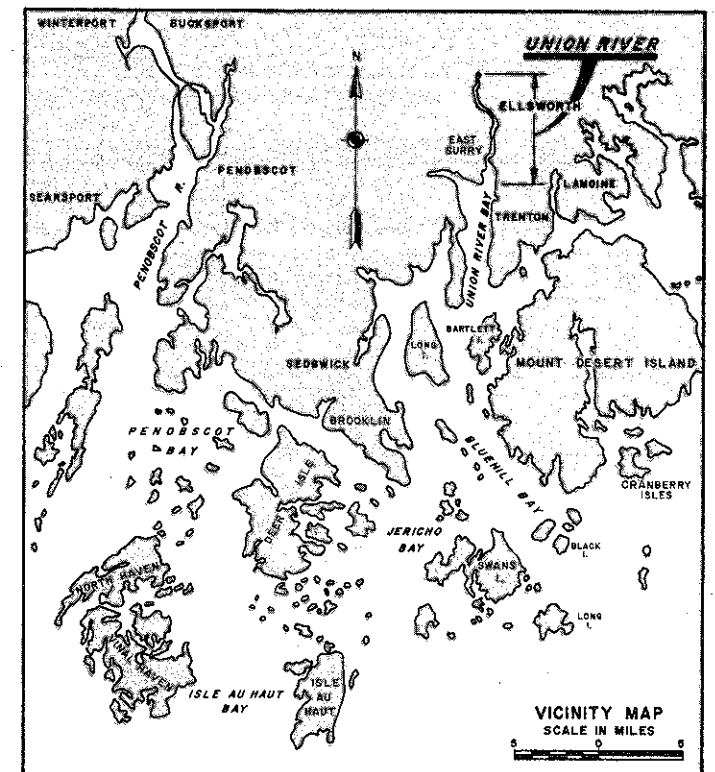
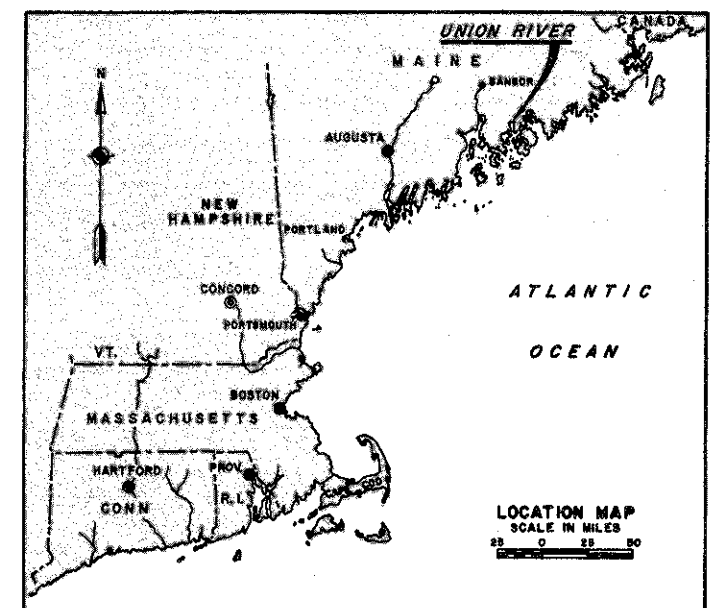
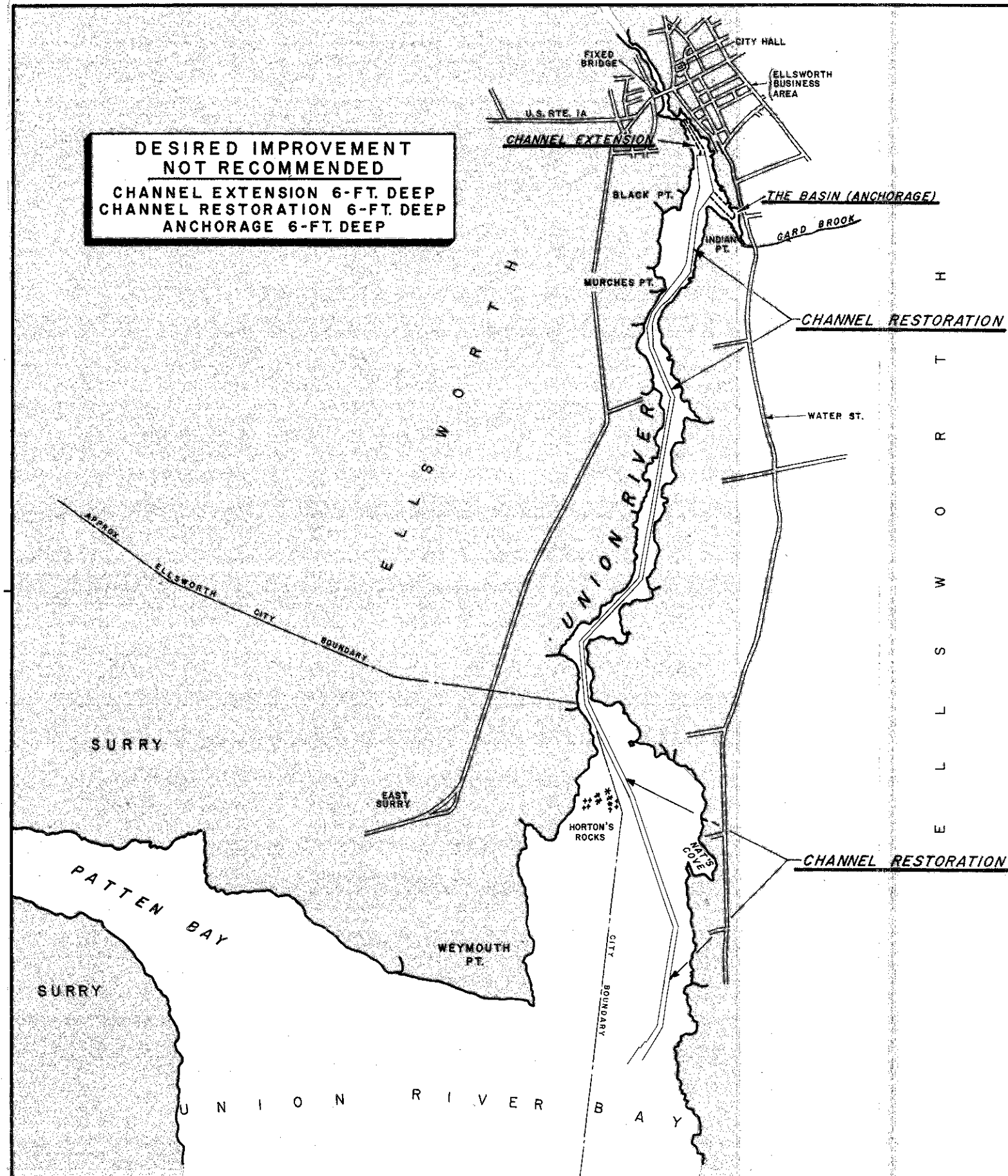
52. In view of the above findings, the Division Engineer recommends that no improvement of Union River be made at this time.

3 Incls

1. App A - U.S. F & W Rpt
2. App B - Corres with Local
Interests
3. Senate Res. 148

FRANK P. BANE

Colonel, Corps of Engineers
Division Engineer



REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

**UNION RIVER, MAINE
VICINITY OF ELLSWORTH
GENERAL MAP**

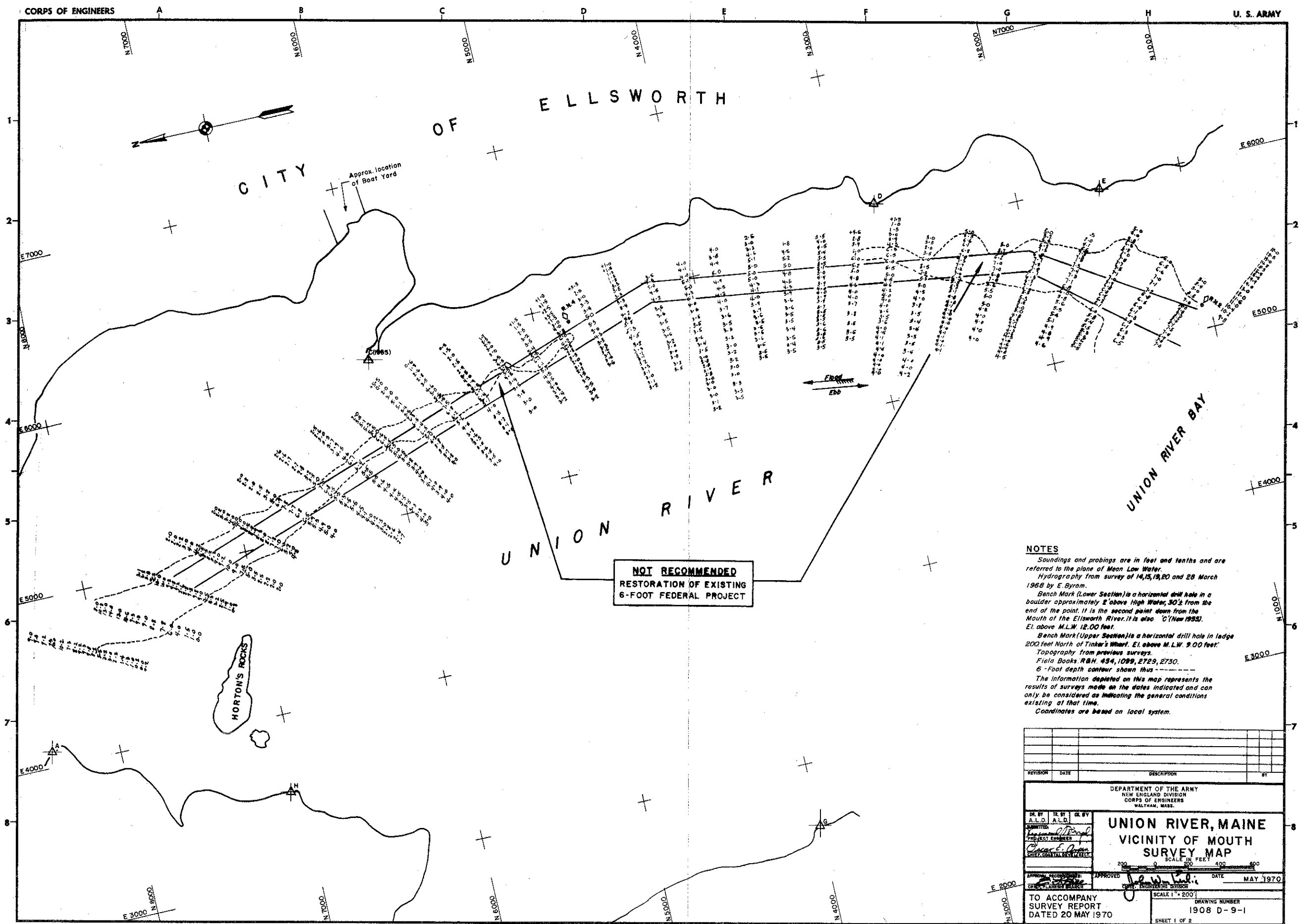
SCALE 1"=1200'

1200 0 2400 3600
SCALE IN FEET

APPROVED: *[Signature]* DATE: MAY 1970
BY: *[Signature]*

TO ACCOMPANY
SURVEY REPORT
DATED 20 MAY 1970

DRAWING NUMBER
1907 D-9-1
SHEET 1 OF 1



NOTES

Soundings and soundings are in feet and tenths and are referred to the plane of Mean Low Water.

Hydrography from survey of 14, 15, 19, 20 and 28 March 1968 by E. Byram.

Bench Mark (Lower Section) is a horizontal drill hole in a boulder approximately 2' above High Water, 30' from the end of the point. It is the second point down from the Mouth of the Ellsworth River. It is also 'G' (New 1955). El. above M.L.W. 12.00 feet.

Bench Mark (Upper Section) is a horizontal drill hole in ledge 200 feet North of Tinker's Wharf. El. above M.L.W. 9.00 feet.

Topography from previous surveys.

Field Books: R.H. 454, 1099, 2729, 2730.

6-Foot depth contour shown thus: ---

The information depicted on this map represents the results of surveys made on the dates indicated and can only be considered as indicating the general conditions existing at that time.

Coordinates are based on local system.

REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

**UNION RIVER, MAINE
VICINITY OF MOUTH
SURVEY MAP**

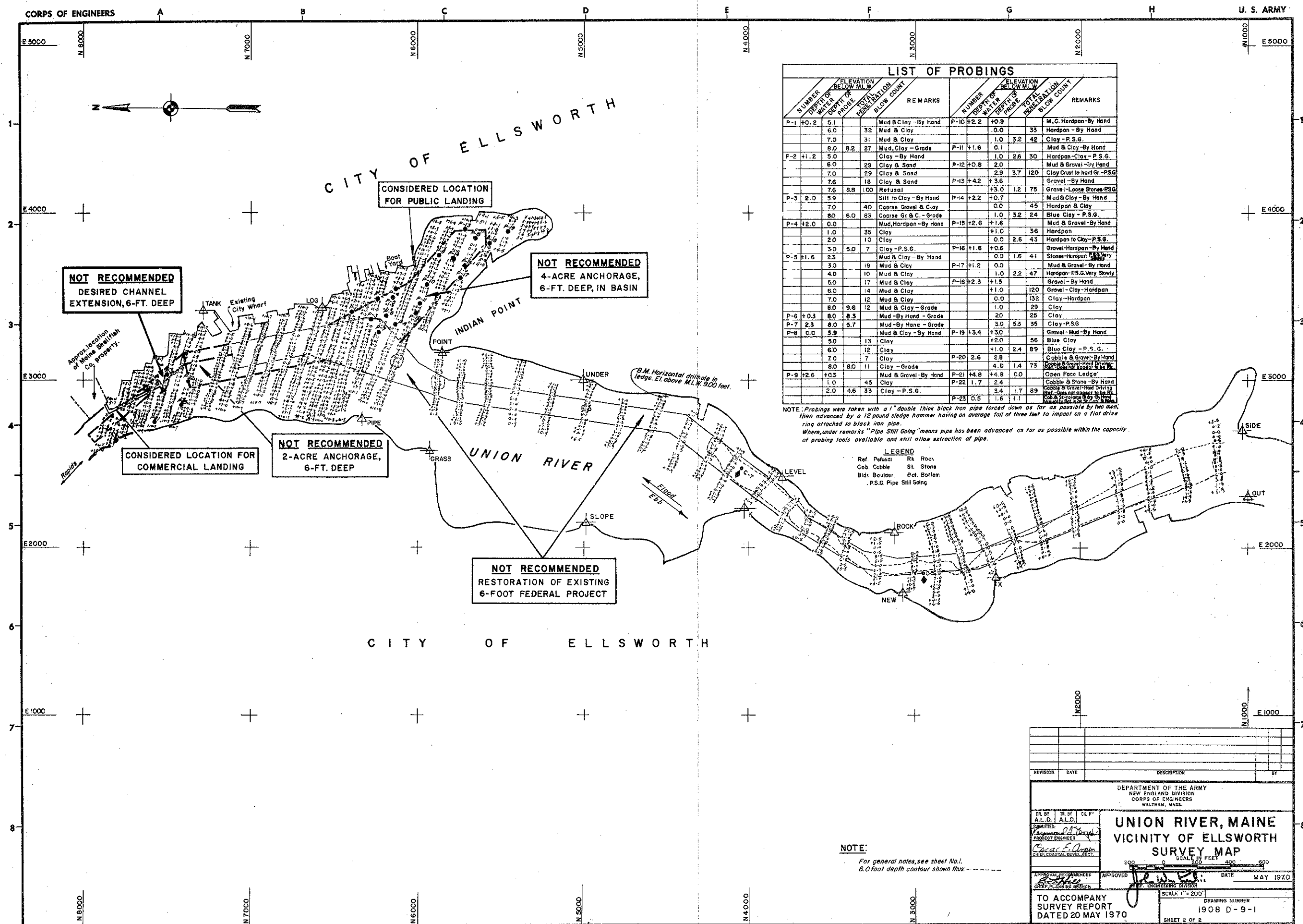
SCALE 1" = 200'

DATE MAY 1970

TO ACCOMPANY
SURVEY REPORT
DATED 20 MAY 1970

DRAWING NUMBER
1908 D-9-1

SHEET 1 OF 2





UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

U. S. POST OFFICE AND COURTHOUSE
BOSTON, MASSACHUSETTS 02109

November 25, 1969

Division Engineer
New England Division
U. S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

This is our conservation and development report on your study of navigation improvements for Union River, Ellsworth (Hancock County), Maine, which is being made under authority of a March 27, 1962, Resolution of the Senate Public Works Committee. Our report was prepared under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-666 inc.), in cooperation with the Maine Department of Sea and Shore Fisheries and Department of Inland Fisheries and Game and has their concurrence as indicated by letters dated November 5 and November 19, 1969, respectively. It has also been coordinated with and represents the views of the Bureau of Commercial Fisheries.

Our July 31, 1968, preliminary report stated that lobstering and scallop dragging are the major commercial interests in the area and that an improved channel would facilitate marketing of scallops, clams, shrimp and other marine products in the Ellsworth area. Since bottom deposits in the Union River are suspected of being composed of sewage sludge, we recommended that spoil be placed above mean high water or in an approved offshore dumping ground. This recommendation is still applicable.

We understand that your study has given consideration to increasing the channel depths in the Union River from the vicinity of Indian Point to Weymouth Point for the purpose of enabling small commercial vessels to

travel upstream to the Town of Ellsworth. We have been advised by your staff that there is not sufficient economic justification for the project at the present time. If improvements for the Union River are planned at a future date, we would appreciate being advised in sufficient time to prepare a new report evaluating the effects on fish and wildlife resources.

We appreciate the opportunity to report on your planning.

Sincerely,

Richard E. Griffith

Regional Director

APPENDIX B

CITY OF ELLSWORTH
MUNICIPAL OFFICES
ELLSWORTH, MAINE



JOHN W. TRUE
CITY MANAGER

May 1, 1970

Mr. Raymond J. Boyd
Project Engineer
Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02154

Dear Mr. Boyd:

Thank you for your extension of time to permit the Ellsworth City Council to decide what course to follow in regard to the matter of river dredging.

At the last meeting of the City Council it was RESOLVED, "Not to appropriate funds to continue the study of a possible marina on Union River in connection with dredging of the river, at this time."

This appears to leave no alternative other than accept your recommendation after the thorough study which you made on the proposal.

Very truly yours,

John W. True
City Manager

JWT/fk

RONALD W. GREEN, COMMISSIONER



STATE OF MAINE

DEPARTMENT OF SEA AND SHORE FISHERIES

STATE HOUSE

AUGUSTA, MAINE 04330

May 8, 1970

Division Engineer
New England Division
U. S. Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

Reference is made to my recent telephone conversation with Mr. Raymond J. Boyd, project engineer, and to a letter dated May 1, 1970, to Mr. Boyd from Ellsworth City Manager John W. True, regarding the proposed navigation improvement in Union River.

While this Department has not had the opportunity to review the pending report of the Corps on this project, it does appear -- based on meetings and verbal explanations -- that the Corps is presently unable to find economic justification for the Union River project. This lack of justification appears to be reinforced by Mr. True's letter of May 1, which indicates the city does not have funds with which to pursue the development of a public marina.

Although it may be that this project cannot be economically justified at this time, we would hope that, when circumstances warrant it, the Union River project will receive further consideration from the Corps.

Sincerely,

A handwritten signature in cursive script, appearing to read "Ronald W. Green".

Ronald W. Green
Commissioner

UNION RIVER, ELLSWORTH, MAINE

Information called for by Senate Resolution 148, 85th Congress, adopted
28 January 1958

1. Navigation Problems. Union River flows through the city of Ellsworth which is located about 29 miles southeast of Bangor, Maine and 15 miles northeast of Bar Harbor, Maine. The navigable portion of the river is tidal and follows a winding course for about 3-3/4 miles to the head of navigation. In this tidal reach, the existing Federal project provides for a channel 6 feet deep at m. l. w. and 100-200 feet wide.

2. The chief problems are inadequate water depth at low tidal periods and limited anchorage space at the head of navigation. Also, commercial wharves are non-existent and there is a need for adequate public facilities for recreational craft.

3. Improvement Considered. Local interests requested restoration of the existing Federal project, channel extension and additional anchorage space at the head of navigation. All possible alternative plans of improvement were considered to provide for the needs of navigation on the river. The most beneficial plan would provide for restoration of the Federal channel and additional anchorage as desired. The estimated cost, excluding restoration, is \$1,083,000. However, the annual charges far outweigh project benefits, leaving no alternative but to recommend Federal navigation improvements not be undertaken at this time.

4. Discussion. Study findings have been reviewed and explained to local interests. By letter of 1 May 1970 (APPENDIX B), they reported their awareness of the Corps' considerations and concurred in the unfavorable recommendation of the report.